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Theoretical studies of the effects of orbital ordering on spin fluctuations and superconductivity in FeSe SHANTANU MUKHERJEE, ANDREAS KREISEL, Niels Bohr Institute, University of Copenhagen, PETER J. HIRSCHFELD, Department Of Physics, University of Florida, BRIAN M. ANDERSEN, Niels Bohr Institute, University of Copenhagen — FeSe is currently one of the most hotly debated iron-based systems due in part to its very high T_c when monolayers are placed on STO substrates, and in part due to the fact that the material exhibits a structural distortion near T_S, $\sim$ 90K without any concomitant magnetic order. In addition, undoped bulk FeSe samples, which become superconducting below T $\sim$ 8K, display evidence of orbital ordering setting in near T_S. We discuss the normal and superconducting properties of FeSe using a ten orbital tight-binding model, and include the effect of ferro-orbital ordering. The model reproduces the essential features of FeSe band structure seen in ARPES [1] and quantum oscillation experiments [3]. Using this model, the spin lattice relaxation rate is calculated and the results are compared with recent NMR experiments [2]. We next discuss the consequences of a spin fluctuation mediated superconducting pairing in FeSe and the resulting gap structure. Finally, the local density of states derived from our calculations is compared to STM experiments [4].

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